

- 1 1. A stencil for applying surface mount materials, comprising:
2 at least two layers, said at least two layers comprising:
3 at least one reservoir pocket; and
4 at least one delivery aperture, wherein said at least one delivery
5 aperture delivers surface mount materials from said at least one reservoir pocket to a
6 surface.
- 7
- 8 2. The stencil of claim 1 wherein said at least two layers further comprise:
9 at least one relief area, wherein said at least one relief area provides
10 clearance for preexisting components on said surface so as to allow said at least one
11 delivery aperture to contact said surface.
- 12
- 13 3. The stencil of claim 2 wherein said stencil comprises two layers,
14 an upper layer having at least one reservoir pocket; and
15 a lower layer having at least one delivery aperture and at least one relief area.
- 16
- 17 4. The stencil of claim 2 wherein said stencil comprises two layers:
18 an upper layer having at least one reservoir pocket and at least one relief area;
19 and
20 a lower layer having at least one delivery aperture and at least one relief area,
21 wherein the at least one relief area of the upper layer is connected to the at least one
22 relief area of the lower layer.
- 23
- 24 5. The stencil of claim 2 wherein said stencil comprises three layers:
25 an upper layer having at least one reservoir pocket;
26 a middle layer having at least one relief area and at least one reservoir pocket;
27 and
28 a lower layer having at least one delivery aperture and at least one relief area,

1 wherein the at least one reservoir pocket of the upper layer is connected to the at least
2 one reservoir pocket of the middle layer, and the at least one relief area of the middle
3 layer is connected to the at least one relief area of the lower layer.

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5 6. The stencil of claim 1 wherein said surface is selected from the group consisting of: a
6 printed circuit board, a flexible circuit, and a wafer.

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8 7. The stencil of claim 1 wherein said at least two layers are manufactured out of metal.

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10 8. The stencil of claim 1 wherein said at least two layers are manufactured by one or
11 more of the processes selected from the group consisting of: chemical etch, laser cut,
12 and electroforming.

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14 9. The stencil of claim 1 wherein said surface mount materials are selected from the
15 group consisting of: adhesives, conducting adhesives, solder paste, and solder balls.

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17 10. The stencil of claim 1 wherein said at least two layers are attached to one another by
18 means of a dry-mount aqueous solder mask laminate.

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20 11. The stencil of claim 10 wherein said at least two layers are aligned by means of at
21 least one registration pin and at least one registration hole.

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23 12. The stencil of claim 1 wherein said stencil comprises two layers:
24 an upper layer with at least one reservoir pocket; and
25 a lower contacting layer with at least one delivery aperture, wherein said at
26 least one delivery aperture delivers surface mount materials from said at least one
27 reservoir pocket to said surface.

- 1 13. The stencil of claim 1 wherein said at least one reservoir pocket comprises:
2 a step-down pocket, wherein said step-down pocket is adapted to receive
3 surface mount material applied directly into said step-down pocket and is further
4 adapted to receive a device for forcing said surface mount material through said at
5 least one delivery aperture.
- 6
- 7 14. A stencil for applying surface mount materials, comprising:
8 an upper reservoir layer with at least one reservoir pocket;
9 a middle separation layer with at least one relief area, wherein said at least
10 one relief area provides clearance for preexisting components mounted on a surface,
11 and wherein said middle separation layer further comprises at least one reservoir
12 through pocket connected to said at least one reservoir pocket in said upper layer;
13 and
14 a lower contacting layer with at least one delivery aperture, wherein said at
15 least one delivery aperture delivers measured surface mount materials from said at
16 least one reservoir pocket by means of said at least one reservoir through pocket to
17 said surface, and wherein said lower contacting layer further comprises at least one
18 relief opening which is connected to said at least one relief area in said middle
19 separation layer.
- 20
- 21 15. The stencil of claim 14 wherein said surface is selected from the group consisting of:
22 a printed circuit board, a flexible circuit, and a wafer.
- 23
- 24 16. The stencil of claim 14 wherein said upper layer, middle layer and lower layer are
25 manufactured out of metal.
- 26
- 27 17. The stencil of claim 14 wherein said upper layer, middle layer, and lower layer are
28 manufactured by one or more of the processes selected from the group consisting of:
29 chemical etch, laser cut, and electroforming
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- 1 18. The stencil of claim 14 wherein said surface mount materials are selected from the
2 group consisting of: adhesives, conducting adhesives, solder paste, and solder balls.
3
- 4 19. The stencil of claim 14 wherein said upper layer, middle layer, and lower layer are
5 attached to one another by means of a dry-mount aqueous solder mask laminate.
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- 7 20. The stencil of claim 14 wherein said upper layer, middle layer, and lower layer are
8 aligned by means of at least one registration pin and at least one registration hole.
9
- 10 21. A stencil for applying solder balls in a desired pattern onto a substrate, comprising:
11 an upper layer with at least one ball drop reservoir aperture; and
12 a lower contacting layer with at least one relief delivery aperture, wherein said
13 relief delivery aperture draws solder material from said at least one ball drop
14 reservoir aperture and provides clearance for flux on pad sites on said substrate.
15
- 16 22. The stencil of claim 21 wherein said upper layer and lower layer are manufactured
17 out of metal.
18
- 19 23. The stencil of claim 21 wherein said upper layer and lower layer are manufactured by
20 one of the processes selected from the group consisting of: chemical etch, laser cut,
21 and electroforming
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- 23 24. The stencil of claim 21 wherein said upper layer and lower layer are attached to one
24 another by means of a dry-mount aqueous solder mask laminate.
25
- 26 25. The stencil of claim 21 wherein said upper layer and lower layer are aligned by
27 means of at least one registration pin and at least one registration hole.
28
- 29
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1 26. A method for depositing surface mount materials onto a surface, comprising the steps
2 of:

3 matching relief areas in a stencil with preexisting surface mount components
4 on a surface;

5 affixing the stencil to the surface;

6 applying surface mount materials to said stencil such that said surface mount
7 materials fill reservoir pockets in said stencil; and

8 depositing surface mount materials onto said surface through delivery
9 apertures on said stencil, said delivery apertures drawing said surface mount material
10 from said reservoir pockets.

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12 27. The method of claim 26 wherein said surface mount materials are selected from the
13 group consisting of: adhesives, conducting adhesives, solder paste, and solder balls.

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15 28. The method of claim 26 wherein said surface is selected from the group consisting
16 of: a printed circuit board, a flexible circuit, and a wafer.

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